



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER OF PATENTS AND TRADEMARKS
Washington, D.C. 20231
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/196,683	11/20/1998	SEIJI MIZUNO	2013/14	9431

7590

11/15/2002

KENYON & KENYON
1500 K Street, N. W.
Suite 700
Washington, DC 20005

EXAMINER

CREPEAU, JONATHAN

ART UNIT

PAPER NUMBER

1745

DATE MAILED: 11/15/2002

22

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/196,683

Applicant(s)

MIZUNO, SEIJI

Examiner

Jonathan S. Crepeau

Art Unit

1745

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 04 September 2002.
- 2a) ☒ This action is FINAL. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,4-12 and 17-19 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,4-12 and 17-19 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s) _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Response to Amendment

1. This Office action addresses claims 1, 4-12, and 17-19. The claims remain rejected under 35 USC §103 for substantially the reasons of record. Accordingly, this action is made final.

Claim Rejections - 35 USC § 103

2. Claims 8-12, 18, and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP 7-249417 in view of Chow et al (U.S. Patent 5,284,718), in view of Pereira et al (U.S. Patent 6,044,842).

Regarding claims 8, 18, and 19, in the abstract and Figure 1, JP 7-249417 discloses a fuel cell comprising a polymer electrolyte membrane (30) which is bonded to support frames (100) with a layer of adhesive (410). Regarding claims 8, 10, 18, and 19, the support frames function as separators and are arranged across gas diffusion electrodes (40) (see Figs 1, 3). The support frames are comprised of a carbon-containing material such as phenol resin, polyphenylene sulfide, or a polyamide (see paragraph [0025] of the machine translation). Regarding claim 12, spherical spacer beads (60) made of polystyrene are mixed with the adhesive 410 (see paragraph [0024]). Regarding claim 11, the adhesive (410) may comprise a material from a “silicon system” or an “epoxy system” (see paragraph [0026]).

JP 7-249417 does not expressly teach that the adhesive has a durometer A hardness of not greater than 90 (claims 9 and 19), or a modulus of elasticity of not greater than 10 MPa (claims 8

and 18) after cure. The reference also not expressly teach that the adhesive 410 may be a mixture of epoxy resin and modified silicone (claim 11).

In column 2, line 63 et seq., Chow et al. teach that the use of sealing material between a polymer electrolyte membrane and an electrically conductive plate is known, and that the sealant material deteriorates because it is “not sufficiently resilient to withstand compressive forces over time.”

In column 3, lines 1, 2, and 44-59, Pereira et al. disclose an adapter member (20) comprising a “resilient, thermoplastic elastomer” (e.g., silicone) having a durometer A hardness of approximately 50-80, preferably 50-70. Furthermore, the reference teaches that durometer hardness measurements “generally correlate to the elastic modulus or resiliency of rubber compounds under conditions of relatively small strain.”

Therefore, the invention as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made because the artisan would be motivated by the disclosure of Chow et al. to make the seals of the Japanese reference as resilient (elastic) as possible, in hopes of reducing the deterioration of the seals over time. Furthermore, according to the disclosure of Pereira et al., the resiliency, modulus of elasticity, and durometer hardness of a material are generally interrelated quantities (i.e., the durometer hardness and modulus of elasticity are proportional, and both are inversely proportional to the resiliency). As noted above, Chow et al. provides motivation to increase the resiliency of the seals of the Japanese reference, thereby providing motivation to use a material having a low durometer A hardness (i.e., less than 90) and low modulus of elasticity (i.e., less than 10 MPa). As also noted above, Pereira et al. teach a “resilient” material which has a durometer A hardness of 50-80.

Accordingly, in view of the teachings of Chow et al. and Pereira et al., the claimed ranges of durometer hardness and elastic modulus in the adhesives 410 of the Japanese reference would be rendered obvious to a skilled artisan.

Regarding claim 11, which recites that the adhesive is a mixture of epoxy resin and modified silicone, as also noted above, the Japanese reference teaches adhesives of a “silicon system” or “epoxy system” in paragraph [0026]. This disclosure alone is believed to fairly suggest a mixture of the two adhesives, since it has been held that it is *prima facie* obvious to combine two compositions each of which is taught by the prior art to be useful for the same purpose, in order to form a third composition which is to be used for the very same purpose. *In re Kerkhoven*, 205 USPQ 1069 (CCPA 1980). It is further noted that paragraph [0026] of the translation further discloses with regard to the seal 410 that “silicone RTV rubber or urethane RTV rubber which are mentioned later and which are used as elastic adhesives 420 do not interfere, either.” The artisan may reasonably interpret this disclosure as indicating that adhesives used in seal 420 (between the plate 200 and the frame 100) are also suitable for use in seal 410. Paragraph [0034] discloses adhesives for use as seal 420, including “denaturation silicon [added] to the epoxy resin.” Accordingly, the claimed mixture of epoxy resin and modified silicone is further believed to be rendered obvious in view of this disclosure.

3. Claims 1, 4-7 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP 7-249417 in view of Chow et al. in view of Pereira et al. as applied to claims 8-12, 18, and 19 above, and further in view of Palmer (U.S. Patent 4,804,451).

The Japanese reference does not expressly teach that the polymer electrolyte has a molar water fraction of less than 4.

The patent of Palmer is generally directed to electrodialysis and electrodeionization apparatuses using ion exchange membranes. In column 1, lines 47-61, the reference teaches that in devices in which membranes are bonded to frames with an adhesive, the bonds are weak because the membrane surfaces are wet.

Therefore, the invention as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made because the Palmer reference exemplifies that the practice of reducing the water content of ion-exchange membranes prior to bonding is well known in the art. The artisan would thereby be motivated to reduce the water content of the membrane of the Japanese reference prior to bonding in hopes of improving the sealability of the membrane with the separators. Accordingly, the recitation of a molar water fraction of less than 4 is not considered to patentably distinguish over the references.

Response to Arguments

4. Applicant's arguments filed September 4, 2002 have been fully considered but they are not persuasive. The Applicant first asserts that "none of the references teach or suggest a polymer electrolyte film being fixed to a carbon separator." However, it is submitted that the JP '417 reference does in fact teach the presence of a "carbon separator." As noted in section 2 above, the support frame (100) of the reference would function as a separator because it separates individual fuel cell units. The support frame may also be considered to be a

“separator” because it is adhesively bonded to member 200, whereby the entire integrated structure would function as a separator having gas-distribution capability. Further, the support frame is a “carbon separator” because it comprises carbon-containing polymers and resins. It is noted that the instant claims do not specify the form of the carbon (e.g., that the carbon is “elemental,” etc.).

The Applicant further asserts that the Examiner has used hindsight to combine the references and that no motivation exists for combining the references. In response, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971). In this case, it is submitted that the judgment of obviousness only takes into account knowledge that was within the level of skill in the art. This is believed to be borne out by the references, which also supply proper motivation for making the combination. In particular, the Chow et al. reference provides strong motivation to use a “resilient” sealing material. The artisan may then look to the patent of Pereira et al. for the properties of a resilient silicone material, which is the same material used in the seal of the JP ‘417 reference.

The Applicant also asserts that the Palmer reference has also been used in hindsight, and that the reference “is directed to electrodialysis not fuel cells and there is no suggestion in any of the references that the teachings of one could or should be used with another, let alone to specifically form the claimed fuel cell.” However, it is submitted that Palmer is analogous art

with respect to the claimed invention and provides sufficient motivation for combination of itself with the JP '417 reference. As noted in the previous Office action, pursuant to MPEP §2141.01(a), in order to rely on a reference as a basis for rejection of an applicant's invention, the reference must either be in the field of applicant's endeavor or, if not, then be reasonably pertinent to the particular problem with which the inventor was concerned. *In re Oetiker*, 977 F.2d 1443, 1446, 24 USPQ2d 1443, 1445 (Fed. Cir. 1992). It is respectfully submitted that the problem faced by Applicants was improving the sealing between an ion-exchange membrane and a support frame. Accordingly, the Palmer reference is believed to be analogous art, as it is also concerned with improving the sealing between an ion-exchange membrane and a support frame. Additionally, the reference is believed to provide strong motivation to use dry membranes (to increase bond strength, as noted above) in making the fuel cells of JP '417.

Conclusion

5. THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jonathan Crepeau whose telephone number is (703) 305-0051. The examiner can normally be reached Monday-Friday from 9:30 AM - 6:00 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan, can be reached at (703) 308-2383. The phone number for the organization where this application or proceeding is assigned is (703) 305-5900. Additionally, documents may be faxed to (703) 305-5408 or (703) 305-5433.

Any inquiry of general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

JSC

November 12, 2002